

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Applicant: Francois PACHET et al.
U.S. Serial No.: Filed Concurrently Herewith
Title of Invention: REAL TIME AUDIO SPATIALISATION SYSTEM
WITH HIGH LEVEL CONTROL

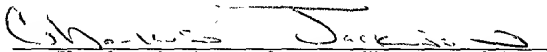
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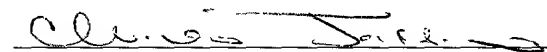
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PRELIMINARY AMENDMENT

Assistant Commissioner for Patents
Box Patent Application (35 U.S.C. 111)
Washington, D.C. 20231

Sir:

Before the issuance of the first Office Action, please amend the above-identified application as follows:

IN THE CLAIMS:

Please amend claims 3-5, 7, 8, 10, 11, 13, 14, 17-19, 21-24, 26, 28-33, 36, 38-42

3. (Amended) System according to claim 1, wherein said group of audio sources reflects an internal coherence with respect to said rules for spatialisation.

4. (Amended) System according to claim 1, wherein said interface means (2) is adapted to display:

- at least one group icon (H) representing a grouped spatialisation command, said icon being positioned according to a topology reflecting a spatialisation and being displaceable by a user, and

- links between said icons expressing constraints to be applied between said group icons.

5. (Amended) System according to claim 1, further adapted to process global commands through said interface means (2) involving a plurality of groups of audio sources simultaneously.

7. (Amended) System according to claim 1, wherein said constraints are one-way constraints, each constraint having a respective set of input and output variables (V) entered by a user through said interface (2).

8. (Amended) System according to claim 1, further adapted to provide a program mode for the recording of mixing constraints entered through said interface means (2) in terms of constraint parameters operative on said groups of audio sources and components of said groups.

10. (Amended) System according to claim 1, wherein said constraints are recorded in terms of metadata associated with said audio stream.

11. (Amended) System according to claim 1, wherein each constraint is configured as a data string containing a variable part and a constraint part.

13. (Amended) System according to claim 11, wherein said constraint part expresses at least one among:

- a constraint type,
- constrained variables (identification of individual tracks) ,
- a list of input variables,
- a list of output variables,
- constraint position,
- constraint orientations.

14. (Amended) System according to claim 1, wherein multiple audio sources for said spatialisation are accessed from a common recorded storage medium (optical disk, hard disk).

17. (Amended) System according to claim 1, further comprising an audio data and metadata decoder for accessing from a common file audio data and metadata expressing said constraints and recreating therefrom :

- a set of audio streams from each individual track contained in said file, and
- the specification of said metadata from an encoded format of said file.

18. (Amended) System according to claim 1, implemented as an interface to a computer operating system and a sound card.

19. (Amended) System according to claim 1, cooperating with a sound card and three-dimensional audio buffering means, said buffering means being physically located in a memory of said sound card so as to benefit from three-dimensional acceleration features of said card.

21. (Amended) System according to claim 1, wherein said input means is adapted to access audio tracks of said audio stream which are interlaced in a common file.

22. (Amended) System according to claim 1, adapted to cooperate with a three-dimensional sound buffer for introducing an orientation constraint.
23. (Amended) System according to claim 1, wherein said constraints comprise functional and/or inequality constraints, wherein cyclic constraints are processed through a propagation algorithm by merely checking conflicts.
24. (Amended) System according to claim 1, further comprising a means for encoding individual sound sources and a database describing the constraints and relating constraint variables into a common audio file through interlacing.
26. (Amended) System according to claim 1, further comprising:
- a constraint system module for inputting a database describing the constraints and relating constraint variables for each music title, thereby creating spatialisation commands; and
 - a spatialisation controller module for inputting said set of audio streams given by encoding means, and spatialisation commands given by said constraint system module.
28. (Amended) System according to claim 26, wherein said spatialisation controller module further comprises a scheduler means for connecting said constraint system module and said spatialisation controller module.
29. (Amended) System according to claim 27, wherein said spatialisation controller module comprises static audio secondary buffer means.
30. (Amended) System according to claim 27, further comprising a timer means for waking up said writing task at predetermined intervals.
31. (Amended) System according to claim 26, wherein said spatialisation controller module is a remote controllable mixing device.

32. (Amended) System according to claim 1, wherein said constraint means (3) is configured to execute a test algorithm.

33. (Amended) A spatialisation apparatus comprising:

- a personal computer having a data reader for reading from a common data medium both audio stream data and data representative of constraints for spatialisation, and

- an audio spatialisation system according to claim 1, having its input means adapted to receive data from said data reader.

36. (Amended) A storage medium containing data specifically adapted for exploitation by an audio spatialisation control system according to claim 1, comprising a plurality of tracks forming an audio stream and data representative of said processing constraints.

38. (Amended) Storage medium according claim 36, wherein said data representative of said processing constraints are recorded as metadata with respect to said tracks.

39. (Amended) Storage medium according to claim 36, wherein said tracks are interlaced.

40. (Amended) Storage medium according to claim 35, in the form of any digital storage medium, such as a CD-ROM, DVD ROM or minidisk.

41. (Amended) Storage medium according to claim 36 in the form of a computer hard disk.

42. (Amended) A computer program product loadable into the internal memory unit of a general-purpose computer, comprising a software code unit for coding the system according to claim 1 and implementing the means described in said system, when said computer program product is run on a computer.

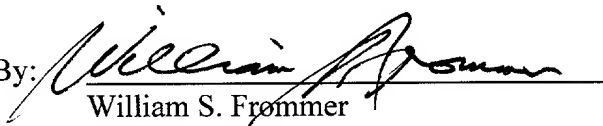
REMARKS

Claims 1-43 remain in the application. Claims 3-5, 7, 8, 10, 11, 13, 14, 17-19, 21-24, 26, 28-33, 36, 38-42 have been amended to eliminate multiple dependencies. Attached hereto is a

marked up version of the changes made to claim 3-5, 7, 8, 10, 11, 13, 14, 17-19, 21-24, 26, 28-33, 36, 38-42 by the current amendment. The attached page is captioned **"Version with markings to show changes made."** The filing fee has been calculated based upon these amendments to the claims.

Respectfully submitted,

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VERSION WITH MARKINGS TO SHOW CHANGES MADE

In the claims:

3. (Amended) System according to claim 1 ~~or 2~~, wherein said group of audio sources reflects an internal coherence with respect to said rules for spatialisation.
4. (Amended) System according to ~~any one of claims 1 to 3~~ claim 1, wherein said interface means (2) is adapted to display:
 - at least one group icon (H) representing a grouped spatialisation command, said icon being positioned according to a topology reflecting a spatialisation and being displaceable by a user, and
 - links between said icons expressing constraints to be applied between said group icons.
5. (Amended) System according to ~~any one of claims 1 to 4~~ claim 1, further adapted to process global commands through said interface means (2) involving a plurality of groups of audio sources simultaneously.
7. (Amended) System according to ~~any one of claims 1 to 6~~ claim 1, wherein said constraints are one-way constraints, each constraint having a respective set of input and output variables (V) entered by a user through said interface (2).
8. (Amended) System according to ~~any one of claims 1 to 7~~ claim 1, further adapted to provide a program mode for the recording of mixing constraints entered through said interface means (2) in terms of constraint parameters operative on said groups of audio sources and components of said groups.
10. (Amended) System according to ~~any one of claims 1 to 9~~ claim 1, wherein said constraints are recorded in terms of metadata associated with said audio stream.

11. (Amended) System according to ~~any one of claims 1 to 10~~ claim 1, wherein each constraint is configured as a data string containing a variable part and a constraint part.

13. (Amended) System according to claim 11 ~~or 12~~, wherein said constraint part expresses at least one among:

- a constraint type,
- constrained variables (identification of individual tracks) ,
- a list of input variables,
- a list of output variables,
- constraint position,
- constraint orientations.

14. (Amended) System according to ~~any one of claims 1 to 13~~ claim 1, wherein multiple audio sources for said spatialisation are accessed from a common recorded storage medium (optical disk, hard disk).

17. (Amended) System according to ~~any one of claims 1 to 16~~ claim 1, further comprising an audio data and metadata decoder for accessing from a common file audio data and metadata expressing said constraints and recreating therefrom :

- a set of audio streams from each individual track contained in said file, and
- the specification of said metadata from an encoded format of said file.

18. (Amended) System according to ~~any one of claims 1 to 17~~ claim 1, implemented as an interface to a computer operating system and a sound card.

19. (Amended) System according to ~~any one of claims 1 to 18~~ claim 1, cooperating with a sound card and three-dimensional audio buffering means, said buffering means being physically

located in a memory of said sound card so as to benefit from three-dimensional acceleration features of said card.

21. (Amended) System according to ~~any one of claims 1 to 20~~ claim 1, wherein said input means is adapted to access audio tracks of said audio stream which are interlaced in a common file.

22. (Amended) System according to ~~any one of claims 1 to 21~~ claim 1, adapted to cooperate with a three-dimensional sound buffer for introducing an orientation constraint.

23. (Amended) System according to ~~any one of claims 1 to 22~~ claim 1, wherein said constraints comprise functional and/or inequality constraints, wherein cyclic constraints are processed through a propagation algorithm by merely checking conflicts.

24. (Amended) System according to ~~any one of claim 1 to 23~~ claim 1, further comprising a means for encoding individual sound sources and a database describing the constraints and relating constraint variables into a common audio file through interlacing.

26. (Amended) System according to ~~any one of claim 1 to 25~~ claim 1, further comprising:
 a constraint system module for inputting a database describing the constraints and relating constraint variables for each music title, thereby creating spatialisation commands; and
 a spatialisation controller module for inputting said set of audio streams given by encoding means, and spatialisation commands given by said constraint system module.

28. (Amended) System according to claim 26 ~~or 27~~, wherein said spatialisation controller module further comprises a scheduler means for connecting said constraint system module and said spatialisation controller module.

29. (Amended) System according to ~~any one of claims 27 to 28~~ claim 27, wherein said spatialisation controller module comprises static audio secondary buffer means.

30. (Amended) System according to ~~any one of claims 27 to 29~~ claim 27, further comprising a timer means for waking up said writing task at predetermined intervals.
31. (Amended) System according to ~~any one of claims 26 to 30~~ claim 26, wherein said spatialisation controller module is a remote controllable mixing device.
32. (Amended) System according to ~~any one of claims 1 to 31~~ claim 1, wherein said constraint means (3) is configured to execute a test algorithm.
33. (Amended) A spatialisation apparatus comprising:
- a personal computer having a data reader for reading from a common data medium both audio stream data and data representative of constraints for spatialisation, and
 - an audio spatialisation system according to ~~any one of claims 1 to 32~~ claim 1 having its input means adapted to receive data from said data reader.
36. (Amended) A storage medium containing data specifically adapted for exploitation by an audio spatialisation control system according to ~~any one of claims 1 to 32~~ claim 1, comprising a plurality of tracks forming an audio stream and data representative of said processing constraints.
38. (Amended) Storage medium according claim 36 ~~or 37~~, wherein said data representative of said processing constraints are recorded as metadata with respect to said tracks.
39. (Amended) Storage medium according to ~~any one of claims 36 to 38~~ claim 36, wherein said tracks are interlaced.
40. (Amended) Storage medium according to ~~any one of claims 35 to 39~~ claim 35, in the form of any digital storage medium, such as a CD-ROM, DVD ROM or minidisk.
41. (Amended) Storage medium according to ~~any one of claims 36 to 40~~ claim 36 in the form of a computer hard disk.

42. (Amended) A computer program product loadable into the internal memory unit of a general-purpose computer, comprising a software code unit for coding the system according to ~~any one of claims 1 to 32~~ claim 1 and implementing the means described in said system, when said computer program product is run on a computer.